

Kolloquium IPC



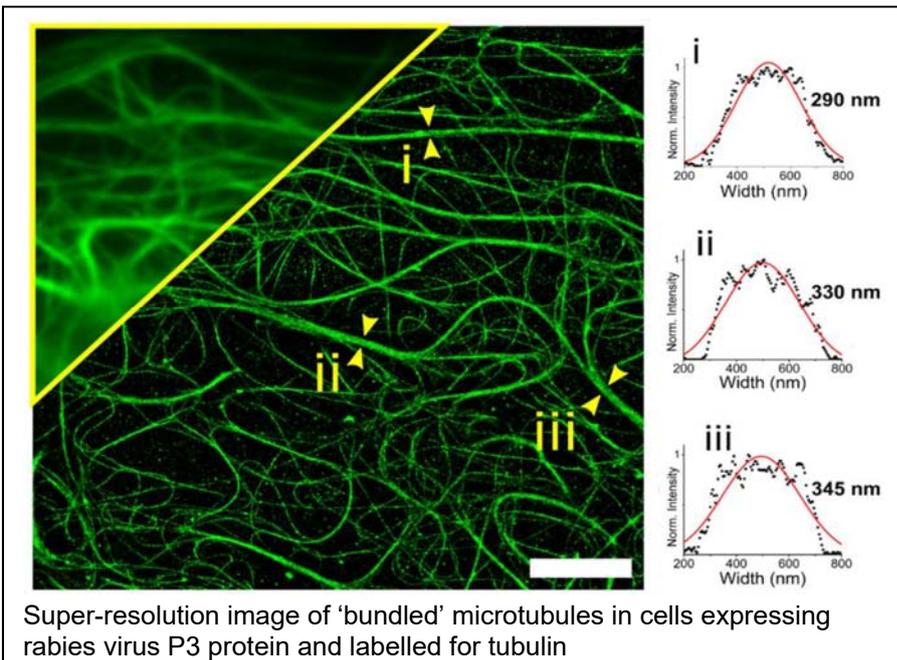
Thursday, 12.12.2019, 17:15 Uhr
Landoltweg 2, PC-Hörsaal

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Time and space resolved fluorescence: from single molecules to super- resolution and beyond

Fluorescence is an exquisitely sensitive and extremely versatile tool for interrogating material and biological samples. Recent years have seen the development of sophisticated fluorescence-based experimental modalities capable of achieving super-resolution imaging with up to an order of magnitude improvement over the diffraction limit of light. In this seminar, I will describe how isolating fluorescence from single molecules in time and space can be harnessed to achieve super-resolution along with our progress in application of this to biological systems. Results from imaging key cellular components such as microtubules, nucleoli and chromosomes will be presented including virally induced changes to sub-cellular architecture in cells transfected with proteins from Rabies and Hendra viruses.[1,2] Finally recent efforts to take super-resolution into live cells and to go beyond current resolution limits by combining super-resolution imaging with other techniques including expansion microscopy, atomic force microscopy and infrared spectroscopy will be discussed.[3]



Super-resolution image of 'bundled' microtubules in cells expressing rabies virus P3 protein and labelled for tubulin

- [1] "Quantitative Analysis of the Microtubule Interaction of Rabies Virus P3 Protein: Roles in Immune Evasion and Pathogenesis", A. Brice, D.R. Whelan, N. Ito, K. Shimizu, L. Wiltzer-Bach, C.Y. Lo, D. Blondel, D. A. Jans, T.D.M. Bell, G.W. Moseley, *Scientific Reports* **2016**, DOI: 10.1038/srep33493.
- [2] "Viral regulation of host cell biology by hijacking of the nucleolar DNA damage response", S.M. Rawlinson, T. Zhao, A.M. Rozario, C.L. Rootes, P.J. McMillan, A.W. Purcell, A. Woon, G.A. Marsh, K.G. Lieu, L.F. Wang, H.J. Netter, T.D.M. Bell, C.R. Stewart, G.W. Moseley, *Nature Communication* **2018**, DOI: 10.1038/s41467-018-05354-7.
- [3] "Correlative Synchrotron Fourier Transform Infrared Spectroscopy and Single Molecule Super Resolution Microscopy for the Detection of Composition and Ultrastructure Alterations in Single Cells", D.R. Whelan and T.D.M. Bell, *ACS Chemical Biology* **2015**, DOI: 10.1021/acscchembio.5b00754.